

SYSTEM AND METHOD FOR PROTECTING A CLIENT DURING RUNTIME FROM HOSTILE DOWNLOADABLES

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is related to co-pending provisional patent application filed on Nov. 8, 1996, entitled "System and Method for Protecting a Computer from Hostile Downloadables," Ser. No. 60/030,639, by inventor Shlomo Touboul, which subject matter is hereby incorporated by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to computer networks, and more particularly to a system and method for protecting clients from hostile Downloadables.

2. Description of the Background Art

The Internet currently interconnects about 100,000 individual computer networks and several million computers. Because it is public, the Internet has become a major source of many system damaging and system fatal application programs, commonly referred to as "viruses."

In response to the widespread generation and distribution of computer viruses, programmers continue to design and update security systems for blocking these viruses from attacking both individual and network computers. On the most part, these security systems have been relatively successful. However, these security systems are typically not configured to recognize computer viruses which have been attached to or masked as harmless Downloadables (i.e., applets). A Downloadable is a small executable or interpretable application program which is downloaded from a source computer and run on a destination computer. A Downloadable is used in a distributed environment such as in the Java™ distributed environment produced by Sun Microsystems or in the ActiveX™ distributed environment produced by Microsoft Corporation.

Hackers have developed hostile Downloadables designed to penetrate security holes in Downloadable interpreters. In response, Sun Microsystems, Inc. has developed a method of restricting Downloadable access to resources (file system resources, operating system resources, etc.) on the destination computer, which effectively limits Downloadable functionality at the Java™ interpreter. Sun Microsystems, Inc. has also provided access control management for basing Downloadable-accessible resources on Downloadable type. However, the above approaches are difficult for the ordinary web surfer to manage, severely limit Java™ performance and functionality, and insufficiently protect the destination computer.

Other security system designers are currently considering digital signature registration stamp techniques, wherein, before a web browser will execute a Downloadable, the Downloadable must possess a digital signature registration stamp. Although a digital signature registration stamp will diminish the threat of Downloadables being intercepted, exchanged or corrupted, this approach only partially addresses the problem. This method does not stop a hostile Downloadable from being stamped with a digital signature, and a digital signature does not guarantee that a Downloadable is harmless. Therefore, a system and method are needed for protecting clients from hostile Downloadables.

SUMMARY OF THE INVENTION

The present invention provides a system for protecting a client from hostile Downloadables. The system includes

security rules defining suspicious actions such as WRITE operations to a system configuration file, overuse of system memory, overuse of system processor time, etc. and security policies defining the appropriate responsive actions to rule violations such as terminating the applet, limiting the memory or processor time available to the applet, etc. The system includes an interface, such as Java™ class extensions and operating system probes, for receiving incoming Downloadable and requests made by the Downloadable. The system still further includes a comparator coupled to the interface for examining the Downloadable, requests made by the Downloadable and runtime events to determine whether a security policy has been violated, and a response engine coupled to the comparator for performing the violation-based responsive action.

The present invention further provides a method for protecting a client from hostile Downloadables. The method includes the steps of recognizing a request made by a Downloadable during runtime, interrupting processing of the request, comparing information pertaining to the Downloadable against a predetermined security policy, recording all rule violations in a log, and performing a predetermined responsive action based on the comparison.

It will be appreciated that the system and method of the present invention use at least three hierarchical levels of security. A first level examines the incoming Downloadables against known suspicious Downloadables. A second level examines runtime events. A third level examines the Downloadables operating system requests against predetermined suspicious actions. Thus, the system and method of the invention are better able to locate hostile operations before client resources are damaged.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram illustrating a network system in accordance with the present invention;

FIG. 2 is a block diagram illustrating details of the client;

FIG. 3 is a block diagram illustrating details of a security system;

FIG. 4 is a block diagram illustrating details of an alternative security system;

FIG. 5 is a flowchart illustrating a method for protecting a client from suspicious Downloadables;

FIG. 6 is a flowchart illustrating the method for managing a suspicious Downloadable; and

FIG. 7 is a flowchart illustrating a supplementary method for protecting a client from suspicious Downloadables.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 is a block diagram illustrating a network system 100 in accordance with the present invention. Network system 100 includes a server 110 coupled to a communications channel 120, e.g., an Internet or an Intranet. The communications channel 120 is in turn coupled to a client 130, e.g., an individual computer, a network computer, a kiosk workstation, etc., which includes a security system 135 for protecting the client 130 from hostile (i.e., will adversely effect the operational characteristics of the client 130) or suspicious (i.e., potentially hostile) downloadables.

Server 110 forwards a Downloadable 140 across the communications channel 120 to the client 130. During runtime, the security system 135 examines each Downloadable 140 and the actions of each Downloadable 140 to monitor for hostile or suspicious actions.